Conformal Curing Oven

TC V3

Maintenance Manual

P/N 7211568

Nordson ASYMTEK

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1 Introduction

Overview

This manual covers maintenance procedures necessary for the preventive and corrective maintenance of the TC V3 Conformal Curing Oven.

WARNING! Maintenance and troubleshooting procedures should only be performed by trained service technicians.

Safety First

Before performing any maintenance or troubleshooting procedures, it is important that you thoroughly read the *TC V3 Operations Manual*. Obey all written safety warnings in the *Safety* section, the warning labels affixed to your curing oven, and your facility safety practices.

Hazardous Materials

Some procedures may involve the use of hazardous materials. To prevent injury to personnel, follow all Federal, State, and local regulations, facility safety practices, and the material manufacturer's Material Safety Data Sheet (MSDS) recommendations.

NOTE Consult safety and disposal precautions on the material manufacturer's Material Safety Data Sheet (MSDS) for all materials used with the cure module.

2 Safety

Overview

Operation of the TC V3 Conformal Curing Oven involves heat, electrical power, mechanical devices, and the use of hazardous materials. It is essential that every person servicing or operating the Cure Module fully understands all hazards, risks, and safety precautions described in this section. When properly operated and maintained, the Cure Module will be safe and reliable.

This section is intended to provide basic safety information necessary for operating, maintaining, and servicing your TC V3 Cure Module. This section covers the following topics:

- Facility Requirements
- Basic Safety Precautions and Practices
- Earthquake Precautions
- Safety Warning Labels
- Emergency Shutdown
- Lockout of Electrical Energy

Use of this equipment in ways other than those described in the documentation supplied with the equipment may result in injury to persons or damage to property.

To further optimize safe operation, maintenance, and servicing of the TC V3, precautions and recommended practices are included with the procedures throughout this manual.

WARNING! Safety is considered a joint responsibility between the original equipment manufacturer and the end-user (owner). Safety precautions and practices should be in accordance with governing laws and regulations, and facility requirements in addition to those recommended in this manual.

WARNING!

CAUTION!

Unsafe equipment conditions can result in personal injury or property damage. Failure to properly operate and maintain the Cure module in accordance with this manual may jeopardize the built-in safety features.

Facility Requirements

To ensure optimal performance and safety, it is necessary to install the Cure Module in a facility that meets the necessary requirements. Refer to the *Operations Manual* for more information.

Basic Safety Precautions and Practices

The following precautions and practices are recommended during Cure Module operation and maintenance.

Safety of Personnel

- Only trained personnel should be permitted to perform operation, maintenance, service, and troubleshooting procedures.
- All personnel working on or near the Cure Module should know the location of all electrical power supply sources.
- Lock/tagout procedures must be performed before service or maintenance work is done on the Cure Module (refer to the "Lockout of Electrical Energy").
- Immediately push the red Emergency Off (**EMO**) button if personnel are in danger of being injured.
- If in a confined room, ensure adequate and uninterrupted air ventilation, heating, and cooling to meet environmental stress limits of personnel and the Cure Module.
- Follow MSDS recommendations for the proper handling, cleanup, storage, and disposal of hazardous materials. Know the MSDS recommendations for treatment of injury resulting from exposure to hazardous materials.

Preventing Cure Module and Workpiece Damage

- Immediately push the **EMO** button if the Cure Module or a workpiece is in danger of being damaged.
- Use standard Electrostatic Discharge (ESD) precautions when working near ESD-sensitive components. Always wear a grounding strap and connect it to the ESD ground before handling work pieces.
- Follow all recommended system maintenance procedures as outlined in the *Maintenance Manual.*
- Ensure that no air intake or exhaust grilles are blocked while the Cure Module is in operation.

WARNING! ***CAUTION!***

Failure to comply with any of the safety recommendations could cause serious injury to personnel and/or damage to the equipment.

Earthquake Precautions

In the event of an earthquake, the cure module must be secured to prevent movement that could cause injury to personnel and damage to the equipment and facility. Each Cure Module leveler (foot) should be anchored to the floor. to the *TC V3 Operations Manual* for Installation Procedures.

WARNING! To prevent injury during an earthquake, all personnel should follow facility earthquake safety guidelines.

Movement

The TC V3 Cure Module is structurally designed to withstand seismic activity in accordance with industry standards. To prevent system movement during an earthquake, each leveler should be anchored to the floor with two bolts. The anchor joint should be able to withstand at least 100 kg (220 lbs.) of pullout force. Refer to the *TC V3 Operations Manual* for installation procedures.

Safety Warning Labels

Warning labels on your TC V3 Cure Module point out areas where personnel must use extreme caution to prevent injury or damage.

WARNING!

CAUTION!

Comply with all safety warning labels or serious injury to personnel and/or damage to the equipment will occur. Worn or damaged labels should be replaced with new labels having the same part number.

Emergency Shutdown

The TC V3 Cure Module features an EMO button that the operator or service technician can use to immediately halt all system operations in case of emergency. This feature helps prevent injury to personnel and damage to the Cure Module and work pieces being processed.

The EMO button is located on the front control panel of the cure module. The EMO cuts power to all system components.

Emergency Shutdown Recovery

WARNING!

CAUTION!

Do not restart the curing operation until the condition causing the emergency shutdown has been remedied. Failure to comply could cause serious injury to personnel and/or damage to the equipment.

To recover after an Emergency Shutdown:

1. Clear the Conveyor of all work pieces.
2. Lock out/tag out all system power. Refer to the *TC V3 Operations Manual* for lockout/tagout procedures.
3. Locate and remedy the cause of the emergency shutdown. Refer to the *Troubleshooting* section for more information.

4. Reset the main circuit breaker inside the electronics enclosure if it has been tripped.
5. Turn the red EMO button clockwise until it pops back into position.
6. Remove all warning tags and locking devices.
7. Restart the Cure Module.
8. Wait at least 30 seconds then push the reset button. Failure to do so could cause problems with the motor speed controller.
9. Open the Alarm window and reset alarms on the PLC. Refer to the *TC V3 Operations Manual* for alarm reset procedures.
10. Click on the **Start** button on the Main Menu.
11. Wait for temperature stabilization before running production. The alarm sounds at start up.

Lockout of Electrical Energy

TC V3 Cure Module electrical components have been designed in accordance with industry-wide safety standards. However, precautions must still be taken whenever personnel may be exposed to the unexpected power-up of the equipment or release of hazardous electrical, ultraviolet, or microwave energy. Lock out and tag out electrical power before performing service or maintenance work on the Cure Module.

WARNING! All personnel working on or near the Cure Module should know the location of all electrical power supply sources.

WARNING!

CAUTION!

Failure to follow lockout/tagout procedures could cause serious injury to personnel and/or damage to the equipment.

Interlock

The Interlock is an electronic connection that immediately cuts power to any motion and pneumatic actuators. If the hood is opened during production, the interlock is activated and all curing activity immediately stops to protect the operator from injury.

3 Maintenance

Overview

Performing the recommended maintenance and service procedures increases the life of your Cure module and ensures high quality performance for every production run.

Safety First

Before you proceed with TC V3 maintenance, make sure you understand the precautions in the *Safety* section and adhere to the precautions during the performance of maintenance procedures.

CAUTION! Maintenance and service should be performed by trained personnel only.

Recordkeeping

At a minimum, the following information should be recorded in the cure module records:

- Date
- Procedure type
- Technician name
- Part/serial numbers of replaced parts
- Post-procedure functional test results

Periodic Maintenance

Performing periodic maintenance procedures increases system life and ensures high quality curing performance for every production run.

WARNING! Unless otherwise specified, the Cure Module should be shut down while performing maintenance or troubleshooting procedures. Refer to "*System Shutdown"* in the *TC V3 Operations Manual.*

Preventive Maintenance

Table 3-1 Preventive Maintenance

Recommended Frequency	Maintenance Procedure	Instructions
WEEKLY – 120 h of Production	Grease chains	The chains must not become dry. For proper chain lubrication, use only PERMA SO14-type oil (high temperature oil). ***NOTE*** Using any other kind of oil or grease can damage the conveyor.
WEEKLY – 120 h of Production	Clean ceramic glasses	Clean the ceramic glasses each week. Depending on your level of production, it may be necessary to clean them more often. It is important to clean all varnish residues from the bottom glasses to ensure a good thermal transfer.
MONTHLY - 600 h of production	Check reproducibility of the thermal cycle	Use a temperature recorder (Datapak, KIK, M.O.L.E. etc.) and a PCB (or other production item) equipped with thermocouples. ***NOTE*** The results of this control must match the profiles previously obtained or the specifications given by the varnish provider.
MONTHLY - 600 h of production	Check exhaust security control	Stop the exhaust or disconnect the pipe. The oven must go into Alarm mode. If the oven doesn't stop, check the functioning of the air flow sensor.
THREE MONTH - 1800 h of production	Check control of speed displayed	While the conveyor is running, use a stopwatch and measuring tape to determine how long it takes the conveyor to move a specified distance. Calculate the speed in cm/min. The calculated speed must be near the speed displayed on the screen (+/- 1 cm/min). ***NOTE*** Make sure that the measuring equipment used (watch and measuring tape) are calibrated.
SIX MONTH - 3600 h of production	Check Emergency Stop buttons	Push one of the emergency stop buttons. Check that the production stops. To restart the equipment, follow the procedure described in the *TC V3 Operations Manual*. ***NOTE*** Check the emergency stop buttons consecutively.
SIX MONTH - 3600 h of production	Check conveyor gears	When disassembling the conveyor chains, check the motion of each gear. If the gear does not turn freely, it must be changed.
SIX MONTH - 3600 h of production	Check wear of the rails	When removing the conveyor chains, check the rails for wear. When the chains are reassembled, they must slide freely along each sliding rail (forward and backward).
ANNUAL - 7200 h of production	Check rails parallelism	Measure the parallelism between the fixed rail and the mobile rail. It must not exceed +/- 0.5mm.

Maintenance Procedures

CAUTION! Maintenance procedures should only be performed by trained service technicians. Refer to the section for more information.

WARNING! Unless otherwise specified, the Cure Module should be shut down while performing maintenance or troubleshooting procedures. Refer to “System Shutdown” in the *TC V3 Operations Manual*.

Conveyor Torque Limiter Adjustment

To adjust the conveyor torque limiter:

1. Turn the power off by moving the Main Switch to the OFF position.
2. Remove the access cover at the output of the conveyor and set aside.

NOTE The torque limiter is mounted on the motor shaft, behind the motor ( ).

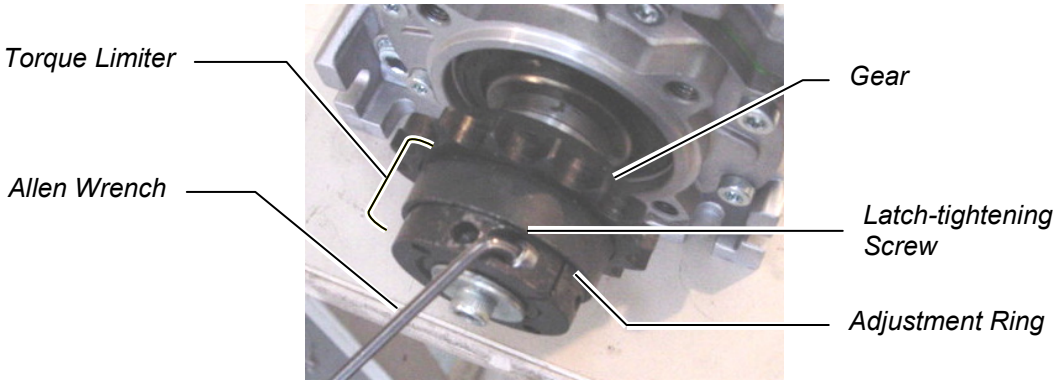


Figure 3-1 Torque Limiter Adjustment

3. Unscrew the latch-tightening screw with an Allen wrench ( ).
4. Adjust the limiter by turning the adjustment ring to allow space to turn the gear by hand.
5. Tighten the latch-tightening screw.
6. Turn the power back on by moving the Main Switch to the ON position.
7. Before starting a production, activate the conveyor movement. Make sure the gear on the motor shaft does not slip.
8. Replace the access cover.

Conveyor Incremental Encoder Adjustment

The Conveyor Incremental Encoder returns an accurate measurement of conveyor speed to the PLC. In the TC oven, the encoder uses a close loop control to ensure the accuracy of the conveyor speed.

Replace the encoder if it is damaged or the speed measurement is inaccurate.

Various conveyor speeds can be used depending on the encoder installed. Table 3-2 lists the available encoder options.

Table 3-2 Optional Encoders

CONVEYOR SPEED	ENCODER PART NUMBER	DESIGNATION
80-400	050865	Encoder 360 pulses
160-800 (STANDARD)	050864	Encoder 200 pulses
300-1500	049615	Encoder 100 pulses

CAUTION! For ovens built before May 2006, the speed measurement is controlled by an inductive sensor (VIT's part number: 007546)

To replace the Conveyor Incremental Encoder:

1. Remove the right hood in front of the machine, at the exit of the oven.
2. Fix the elastic couplings on the encoder and on the shaft.
3. Attach the encoder to the support bracket on the frame.
4. Plug the encoder jack into the female jack.
5. Turn the conveyor on and ensure that the encoder and shaft are properly aligned.
6. Verify the speed value on the control screen is correct.

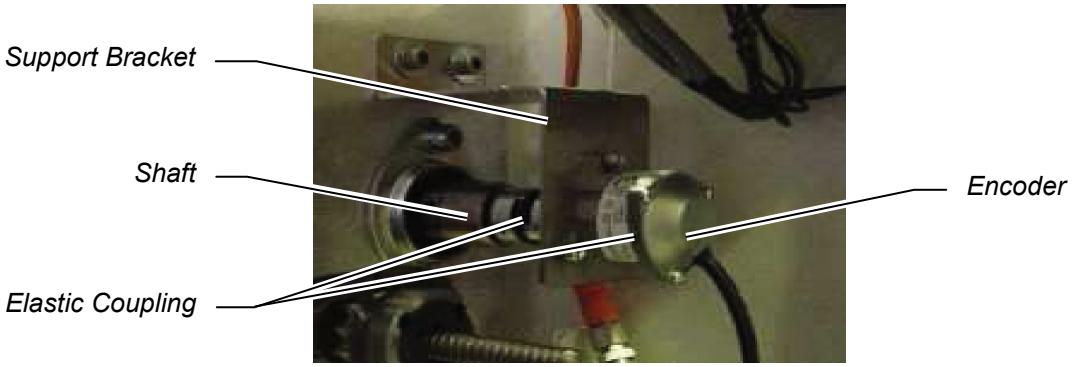


Figure 3-2 Conveyor Counter Cell Location

7. Check again to make sure the cell detects each tooth of the gear.
8. Recalibrate the close loop of the conveyor and check that the real speed of the conveyor is equal to the calculated speed by the PLC.
9. Replace the access cover.

Conveyor Chain Tension Adjustment

To adjust the tension of the conveyor chains:

1. Turn the power off by moving the Main Switch to the OFF position.
2. Remove the access cover at the input of the conveyor and set aside.
3. Using an adjustable wrench, adjust the tension of the spring by turning the adjustment nut (Figure 3-3).
4. Make the same adjustment on the other side of the conveyor.

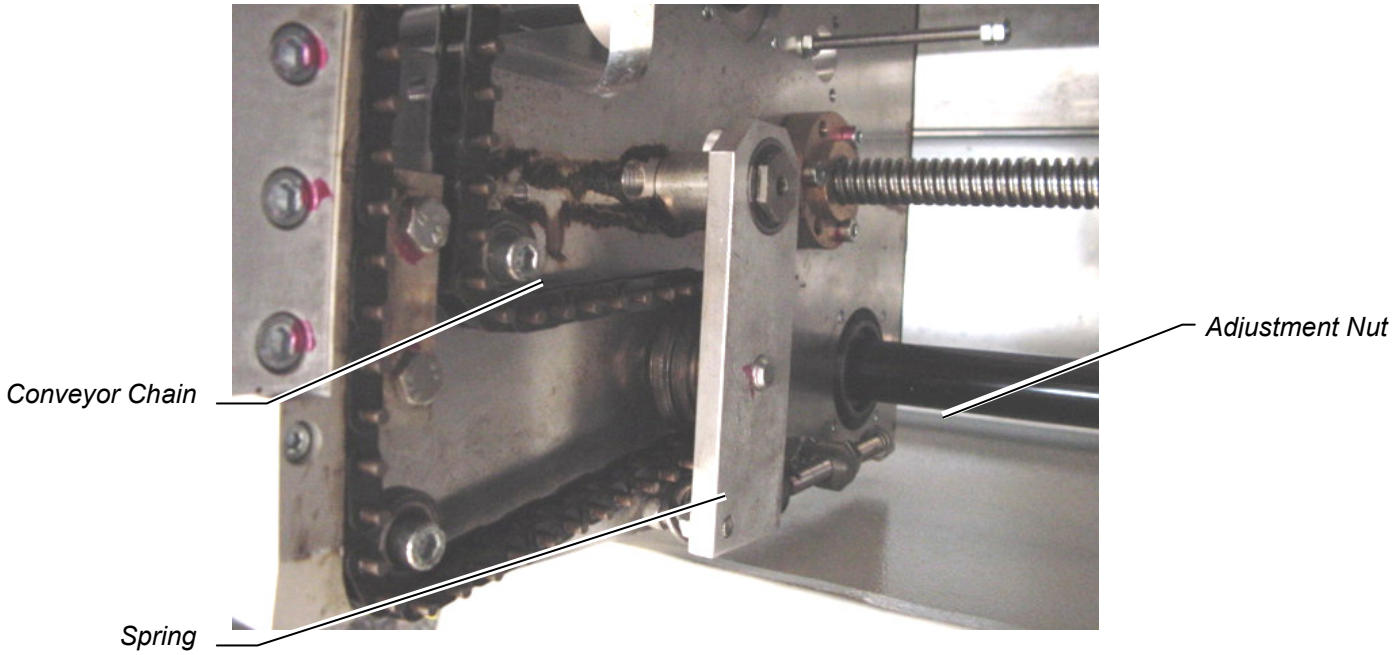


Figure 3-3 Conveyor Chain Location

5. Turn the power on by moving the Main Switch to the ON position.
6. Before starting a production, activate the conveyor movement and check that the conveyor chain turns without any jerk or noise.
7. Replace the access cover.

CAUTION! During production (oven in heating) check that the spring is still in tension.

Transmission Chain Tension Adjustment

To adjust the tension of the transmission chain:

1. Turn the power off by moving the Main Switch to the OFF position.
2. Remove the access cover at the output of the conveyor and set aside.
3. Adjust the tension of the transmission chain by turning the chain tightener with a wrench (Figure 3-4).

Figure 3-4 Transmission Chain Location

4. Turn the power on by moving the Main Switch to the ON position.
5. Before starting a production, activate the conveyor movement and check that the transmission chain turns without any jerk or noise.
6. Replace the access cover.

Adjustment of the Rail Parallelism

If a printed circuit board (PCB) falls down into the oven, the conveyor rail needs adjustment.

To adjust the conveyor rail parallelism:

1. Turn the power off by moving the Main Switch to the OFF position. Wait for the temperature to decrease to cool.

WARNING! Before performing this procedure, it is critical that you wait for the temperature to decrease to cool. Failure to do so could result in serious injury.

2. Lift the hood to access the conveyor rails.

CAUTION! When opening the hood to make adjustments, refer to “Hood Opening/Closing Operation” in the *TC V3 Operations Manual*.

3. With a slide caliper, measure the input width of the conveyor (Figure 3-5).

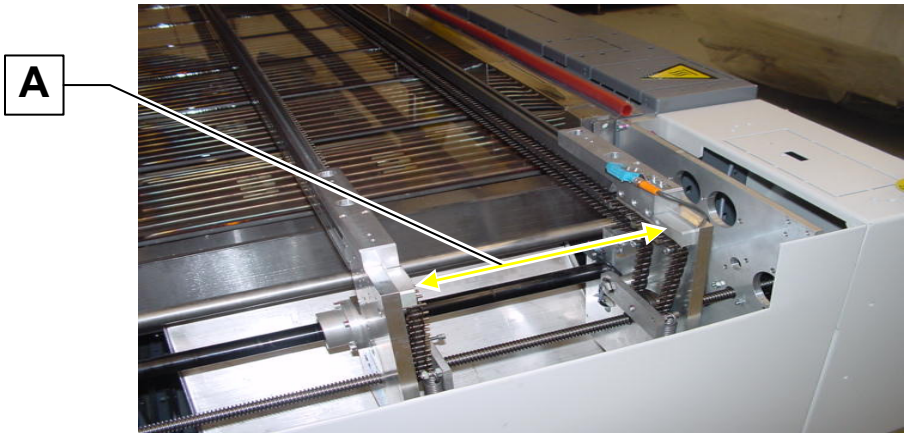


Figure 3-5 Conveyor Input

4. With the same slide caliper, measure the output width of the conveyor (Figure 3-6).

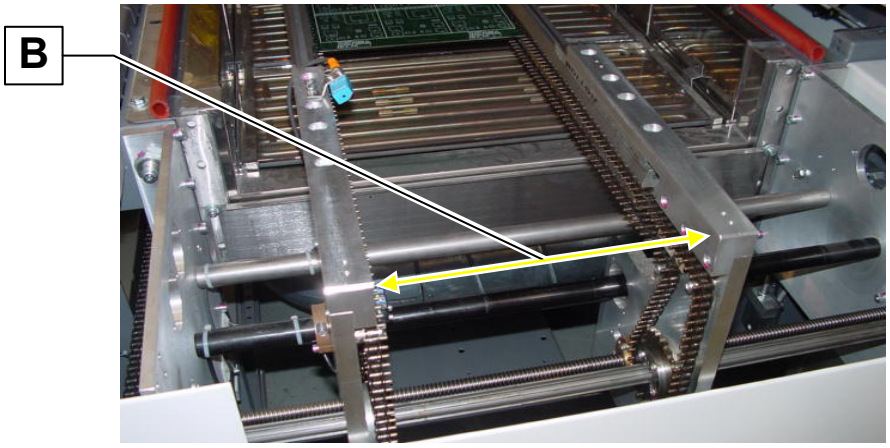


Figure 3-6 Conveyor Output

5. If the input and output measurements are not equal, remove the access cover located under the crank to access the transmission gear. Unscrew the two locking screws (Figure 3-7). Insert one of the screws in the third hole to free the gear's hub and tighten. Make necessary adjustments and replace the locking screws.

6. Replace the access cover.

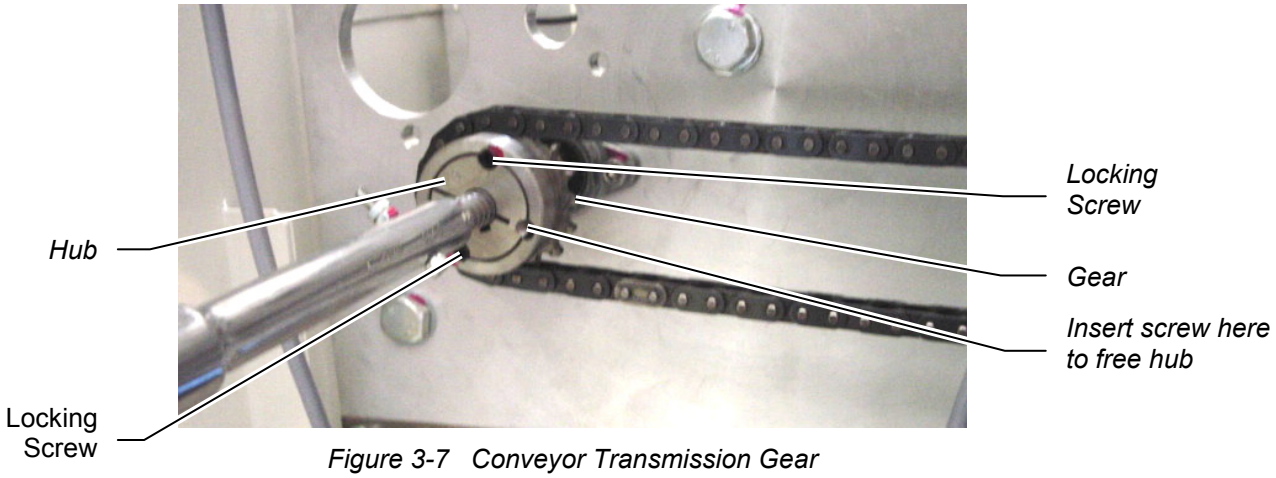


Figure 3-7 Conveyor Transmission Gear

7. Next, measure the width of the rail at the input (C) (Figure 3-8), at the middle section (D) (Figure 3-9), and at the output (E) (Figure 3-10).

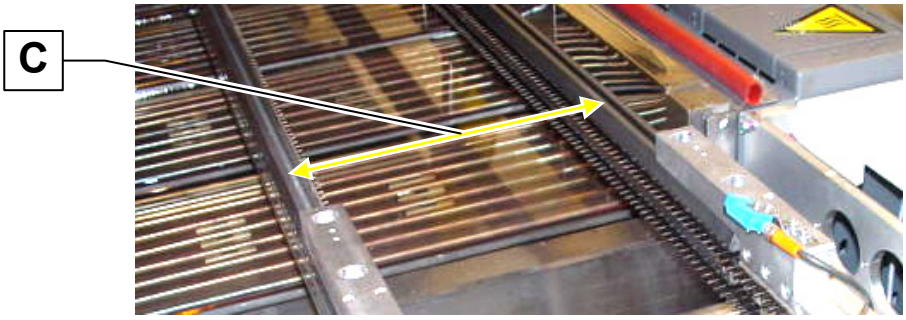


Figure 3-8 Input Rail

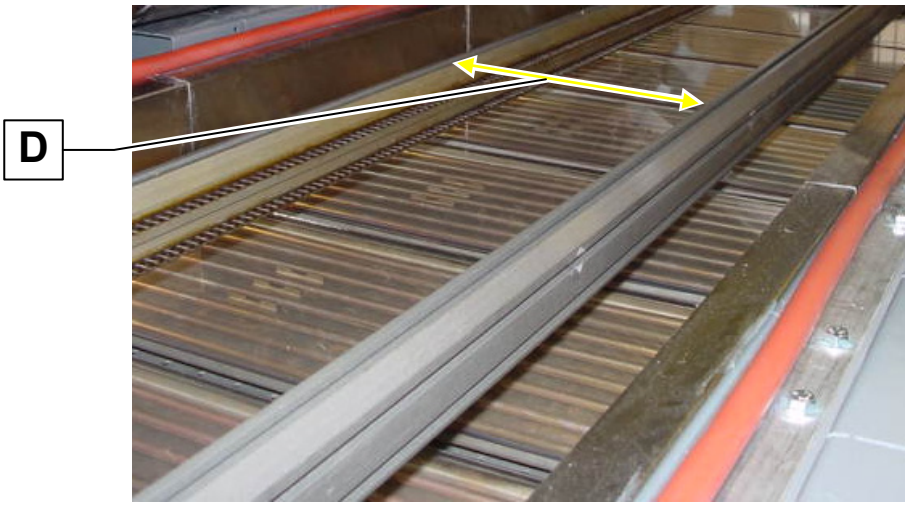


Figure 3-9 Mid-Section Rail

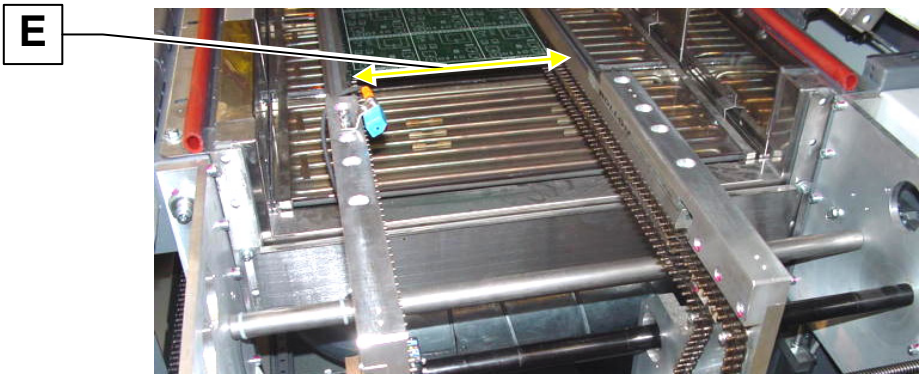


Figure 3-10 Output Rail

8. If the three measurements are not equal, remove the screws from the rail fixation and adjust the position of the rails. See Figure 3-11.

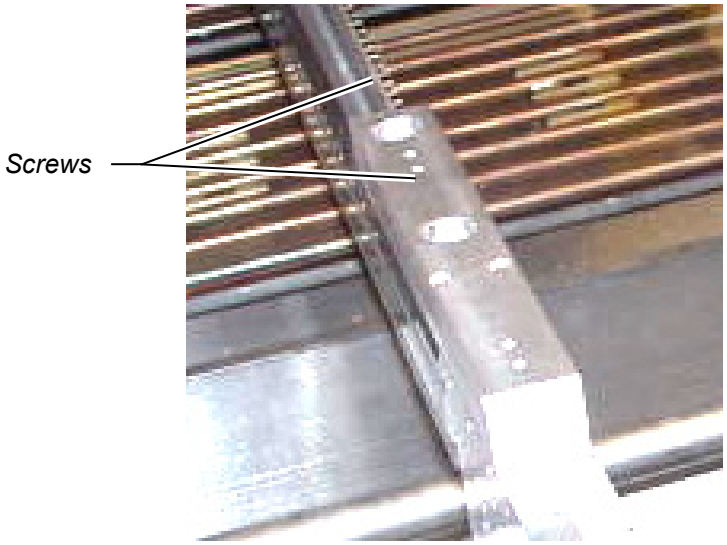


Figure 3-11 Conveyor Rail Screws

9. While the oven is still cold, check that the PCB can slide freely from one side of the oven to the other.
10. Turn the power on by moving the Main Switch to the ON position.
11. When the oven is hot, check that the PCB can slide freely from one side of the oven to the other.

Thermocouple Replacement

To replace a thermocouple:

1. Turn the power off by moving the Main Switch to the OFF position.
2. Open the top rear access cover.
3. Disconnect the defective thermocouple from the connector (Figure 3-12).
4. Unscrew the pressure screw.
5. Remove the old thermocouple.
6. Replace with the new thermocouple.
7. Tighten the pressure screw.
8. Reconnect the thermocouple to the connector.

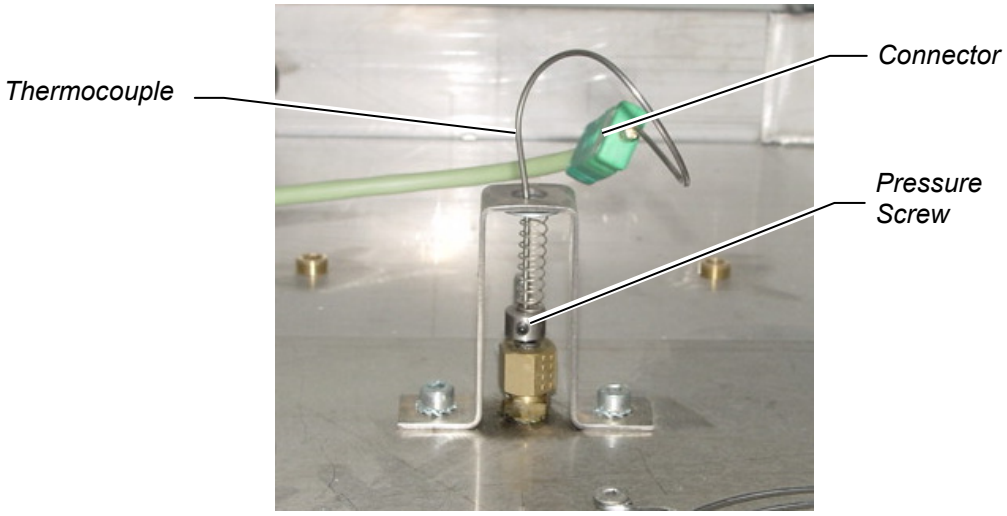


Figure 3-12 Thermocouple

9. Check that the thermocouple is free to move inside the hole and is in contact with the ceramic glass.

NOTE The spring will ensure a permanent contact between the thermocouple and the vitro-ceramic glass.

CAUTION! If a good contact is not made between the thermocouple and the vitro-ceramic glass, the temperature reading will not be correct.

10. On the PLC screen, make sure the temperature reading of the new thermocouple is correct. If not, repeat Step 9.

Resistor Replacement

To replace the top resistor:

CAUTION! Before performing this procedure, make sure the machine power is off. Failure to do so could result in serious injury and damage to the equipment

1. Turn the power off by moving the Main Switch to the OFF position.
2. Open the hood to access the resistor.
3. Open the top access cover of the oven.

CAUTION! You will need to open the hood to make this measurement. Please refer to “Hood Opening/Closing Operation” in the *TC V3 Operations Manual*.

4. Cut the plastic collars off the mask.
5. Remove the mask and set aside.

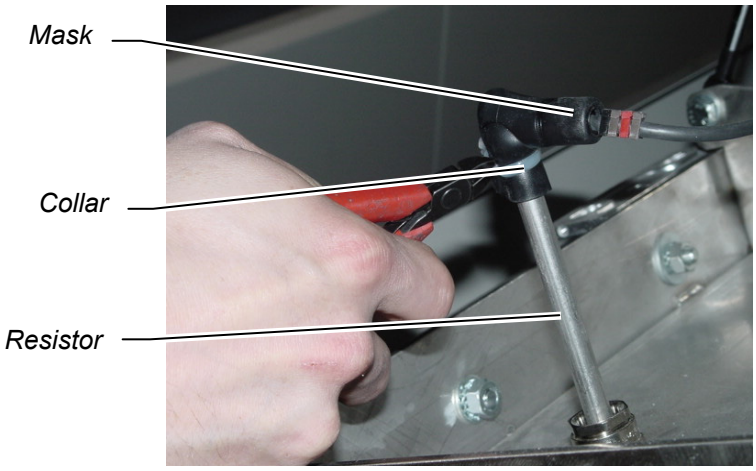


Figure 3-13 Collar

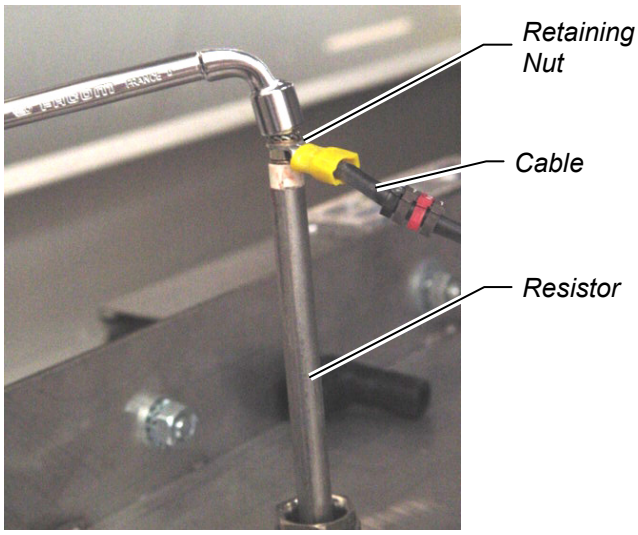


Figure 3-14 Retaining Nut

6. Unscrew the retaining nut on the cable.

Figure 3-15 Stuffing Box

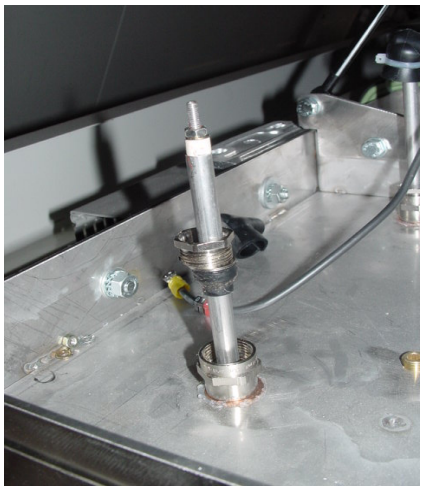


Figure 3-16 Joint

7. Unscrew the nut on the stuffing box and remove the joint.
8. Replace the resistor.

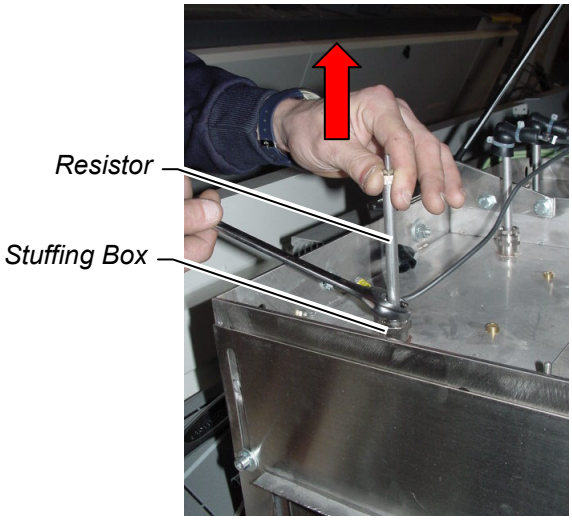


Figure 3-17 Remount Joint

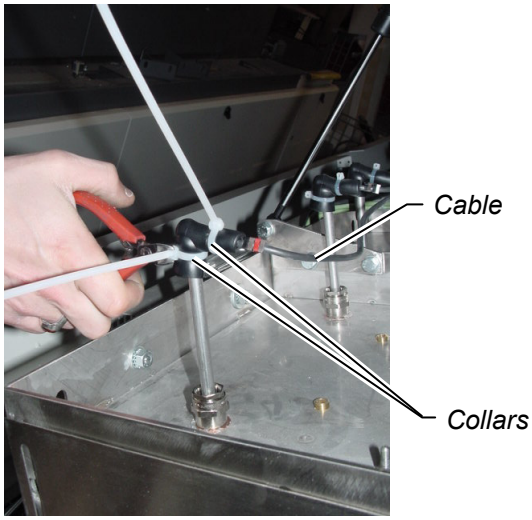


Figure 3-18 Remount Mask

9. Remount joint in the stuffing box and tighten the screw.

CAUTION! To ensure proper positioning of the resistor, pull the resistor on the opposite side of the vitro-ceramic glass while locking the screw of the stuffing box (up if you change a resistor on the volt, down if it is on the plate).

10. Mount the cable and lock the retaining nut on both connections.
11. Remount the mask and lock it with new plastic collars on both connections.
12. Repeat Steps 4 through 9 on the remaining resistor connection.

13. Replace the top access cover.
14. Close the hood using proper procedures described in “Hood Opening/Closing Operation” of the *TC V3 Operations Manual*.

To replace the bottom resistor:

1. Turn the power off by moving the Main Switch to the OFF position.
2. Open the hood to access the resistor.
3. Open the bottom access cover of the oven.
4. To remove the vitro-ceramic glass, on the inside of the oven unscrew the screw and remove the clips from the maintenance part.

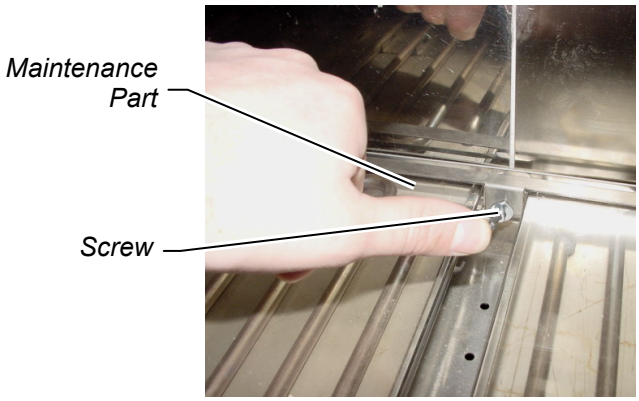


Figure 3-19 Maintenance Part Screw

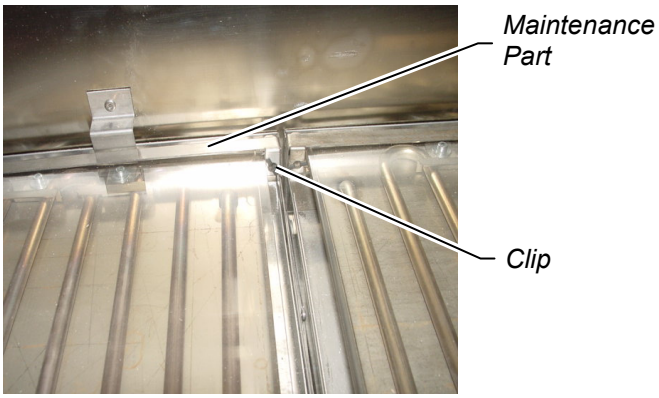


Figure 3-20 Maintenance Part Clip

5. Repeat Step 4 for the other side of glass.
6. Carefully remove the glass.
7. To remove the resistor, unscrew the brides on each side and set aside.

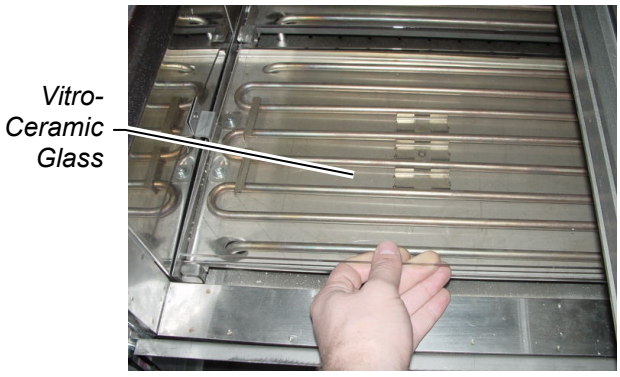


Figure 3-21 Remove Vitro-Ceramic Glass

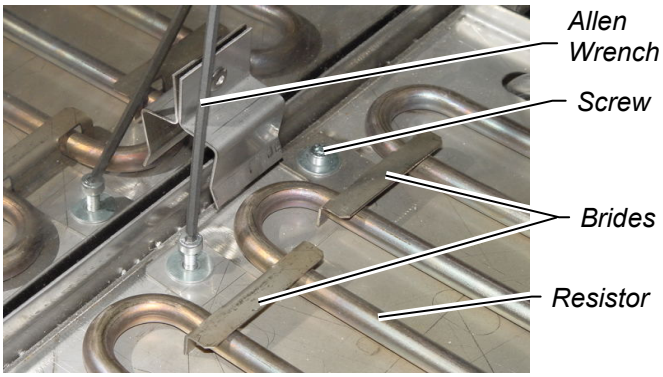


Figure 3-22 Bride Location

8. Remove the resistor and carefully replace with the new one.
9. Secure in place by re-installing the brides on each side.
10. Carefully re-install the vitro-ceramic glass.

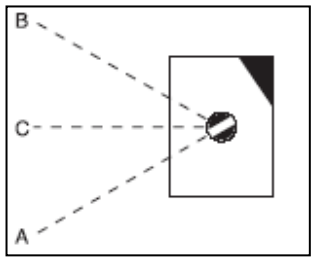
11. Re-attach the clips on the maintenance part.
12. Check to make sure the new resistor is positioned in line with the glass.
13. Check the profile and auto-tune if necessary. Refer to the *Auto-Tune Procedure*.
14. Replace the bottom access cover.
15. Close the hood using procedures described in the *Operations Manual*.

Setting of Upstream/Downstream Board Counter Cell (optional)

To adjust the upstream/downstream board counter:

NOTE For both cells (input/output) follow the same procedures as outlined below.

1. Turn the power on by moving the Main Switch to the ON position.
2. With a screwdriver, set scanning distance on the counter cell to max (Figure 3-23).
3. Position the board. Position light spot on board with red sender light spot visible on object. Signal strength indicator should light up. If it does not light up readjust the position and orientation and/or clean the photo-electric proximity switch (Figure 3-24).
4. Remove the board, signal strength indicator should go out (position A=max.). If it does not go out, turn switch towards min. until it goes out (e.g. position A).
5. Set switch to min. Position object. Turn switch towards max until signal strength indicator lights up (e.g. position B).
6. If position B<position A: Select middle setting (e.g. position C). Check complete functioning. Functioning OK, setting completed. Functioning not OK, check and readjust application conditions.



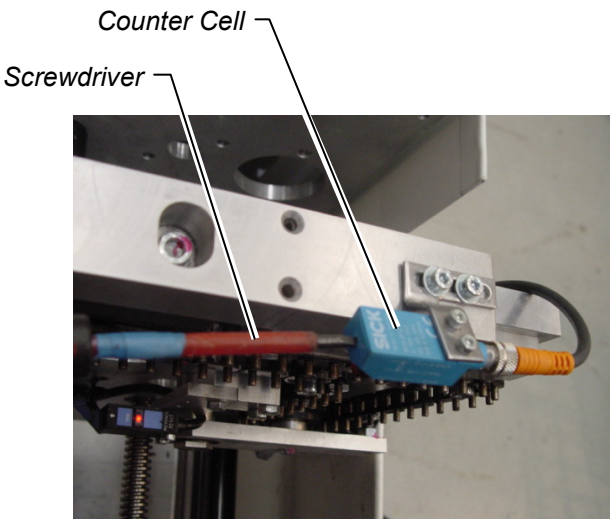


Figure 3-23 Counter Cell

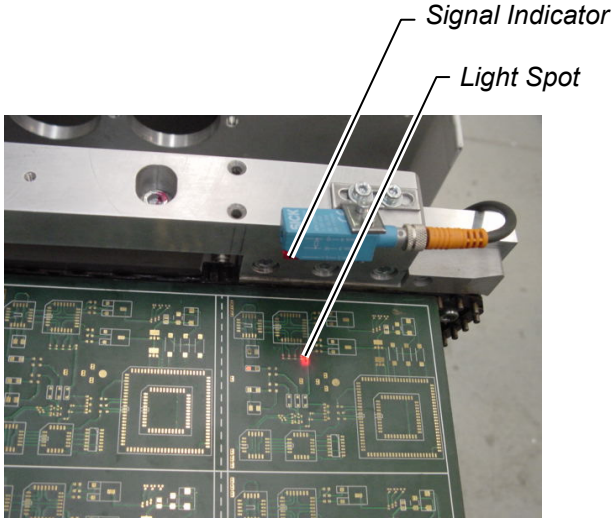


Figure 3-24 Signal Indicator

7. Check against another board to make sure the adjustment is correct.

Adjustment of the Dropped Board Detection Cell (optional)

To adjust the dropped board detection cell:

1. Turn the power on by moving the Main Switch to the ON position.

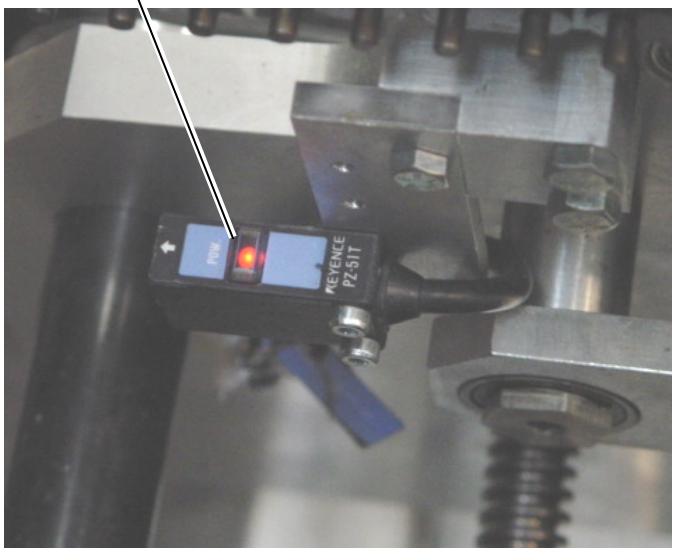


Figure 3-25 Emitter Cell

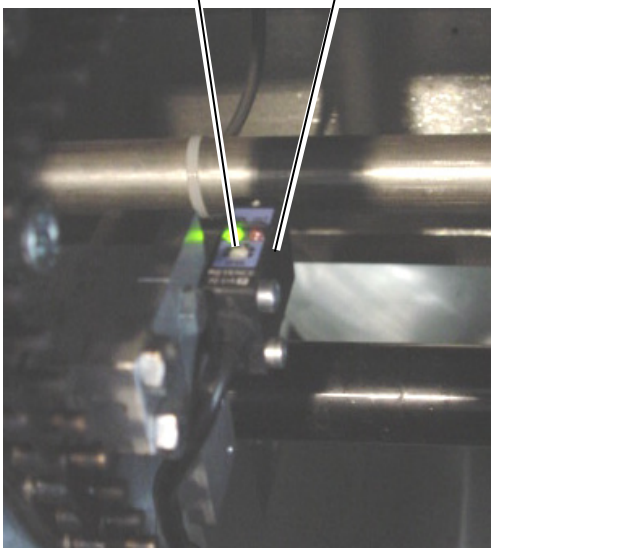
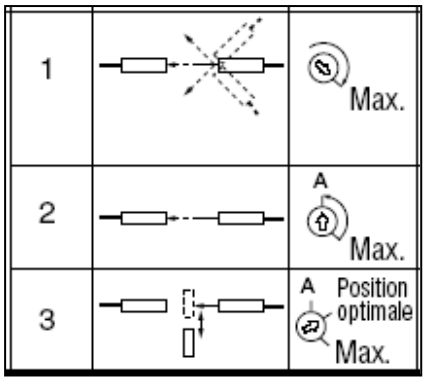


Figure 3-26 Receiver Cell

NOTES The emitter cell (Figure 3-16) is at the input of the conveyor, it has only one red LED. This red LED should always be switched on and represents the status “under voltage”.

The receiver cell (Figure 3-17) is at the output of the oven, it has 2 LED. The red LED indicates input status (red light on = object detected, red light off = no object detected), the green LED indicates signal quality.

2. For each cell, turn the adjustment screw to the max position, then adjust the physical position of the receiver or emitter until the green LED light is on.
3. Turn the adjustment screw counterclockwise until the green light is off (position A).
4. Turn the screw in the middle position between max and A.
5. Check for positive detection with the board.
6. Check against another board to make sure the adjustment is correct.



Auto-Tune Procedure

The purpose of the auto-tune is to set PID parameters of temperature control loops. This function is used only if the regulation of a zone is not stable. Example: setpoint 120 and measure move from 110 to 130°C. PID are adjusted in factory before departure of the oven.

WARNING! Never perform the auto-tune if not necessary.

WARNING! Before activating the auto-tune, read through the complete procedure. IMPROPER HANDLING COULD DAMAGE THE OVEN. Do not perform the auto-tune procedure while the oven is running in production.

To set PID parameters of temperature control loops:

1. Click on the setpoint box of a zone (Figure 3-27).

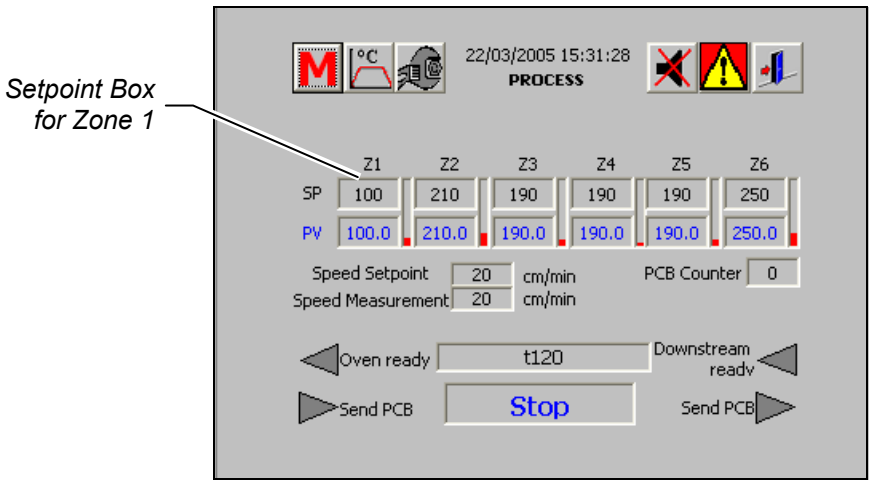


Figure 3-27 Setpoint Box

2. Click on REG Z1 to access the PID Loop Control (Figure 3-28).

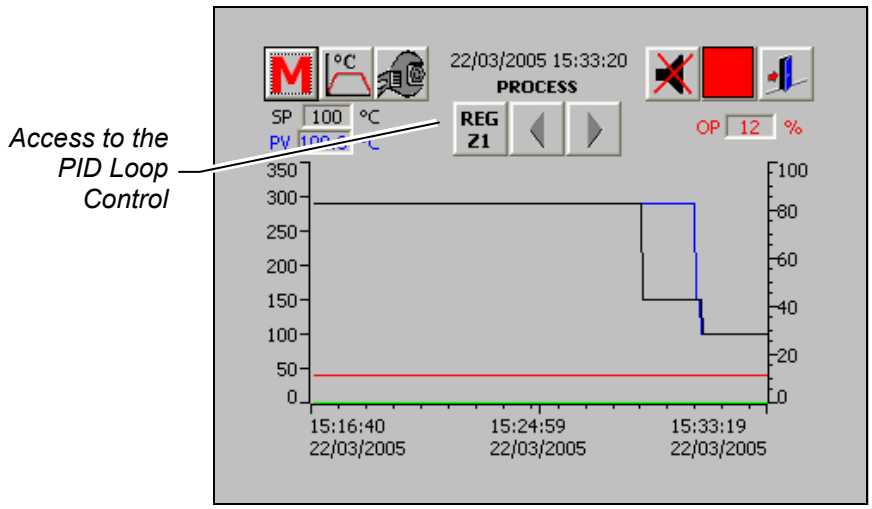


Figure 3-28 Reg Z1 Button

3. Click on a graphical visualization of a zone (Figure 3-29).

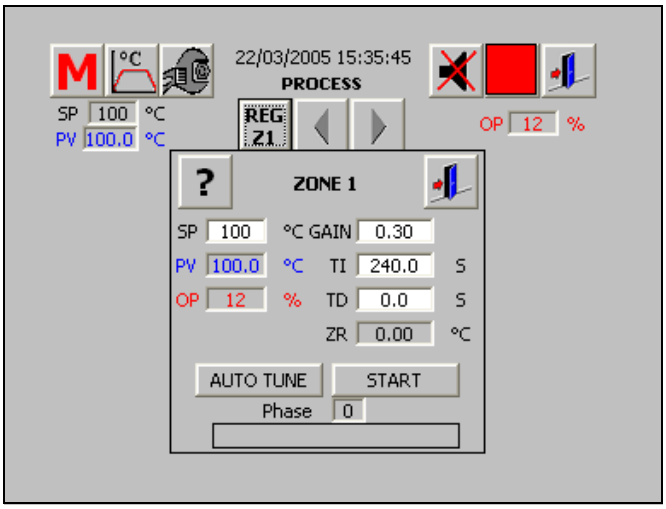


Figure 3-29 Graphic Visualization of a Zone

4. Apply the values below according to the type of regulator (PI or PID) you want (Table 3-3).

Table 3-3 Regulator

Regulator PI	Regulator PID
Gain : 1	Gain : 1
TI : 0 s	TI : 0 s
TD : 0 s	TD : 9999 s
ZR : 0 °C	ZR : 0°C

5. Enter the temperature set point (150 °C max).
6. Wait for stability of the oven.
7. Click on **Auto Tune**.
8. Click on **Start**.
9. Wait for the end of "AUTO TUNE" and repeat for the remaining zones.

CAUTION! **DO NOT STOP** the oven during "AUTO TUNE".

4 Troubleshooting

Overview

Troubleshooting helps you identify common problems that you may experience with your cure module and offer suggestions for correcting them.

Safety First

Before you proceed with TC V3 troubleshooting, make sure you understand the precautions in the *Safety* section and adhere to the precautions during the performance of troubleshooting procedures.

CAUTION! Troubleshooting should only be performed by a trained service technician.

WARNING! Before troubleshooting the curing module, first turn OFF and disconnect all power to the unit. Reconnect power only as necessary for troubleshooting. Allow at least five seconds for the power supply high-voltage capacitor to discharge any residual energy. Do not touch metal parts that may contain voltage when power is ON.

Troubleshooting Alarms

Figure 4-1 Troubleshooting Alarms

Alarms / Trouble	Possible Causes	Verifications and Actions
Emergency Stop Alarm	Emergency button activated	Pull and turn the emergency stop button to the right to restore to normal position. Press re-armament switch.
	Re-armament button not activated	Press on the re-armament button to see if the button's light switch is on. If not, check the wiring and the button.
	Security relay defective	Check wiring and relay. Replace relay if defective.
Exhaust Alarm	Pressure sensor defective or badly connected	Check pressure sensor adjustment and pipe connection. If the adjustment and the connection are good, change the sensor.
Alarm Conveyor 1 – Low Speed Alarm	Speed Sensor defective	Check the sensor position and compare to the pinion teeth. Re-adjust if necessary. Check the wiring. Check the sensor. Change the sensor if it is defective.
	Fuse of the speed controller	Check the fuse. Replace if necessary.
	AL1 higher than the setpoint speed defined in the recipe	Check the value and decrease the AL1 value in the recipe.
	Bad calibration	Recalibrate the conveyor (refer to the *TC V3 Operations Manual*).

Alarms / Trouble	Possible Causes	Verifications and Actions
Alarm Conveyor 2 – Speed Band Alarm	Speed Sensor defective	Check the sensor position and compare to the pinion teeth. Check the wiring.
	AL2 too low	Increase the value of the alarm band.
	Bad calibration	Recalibrate the conveyor (Refer to the *TC V3 Operations Manual*).
High Temperature Alarm (AL1)	Bad PID loop tuning	Perform an auto-tune procedure.
	Thermocouple defective	Check the thermocouple wiring and location. It should be in contact with the vitro-ceramic glass.
Temperature Band Alarm (AL2)	Bad PID loop tuning	Perform an auto-tune procedure.
	Thermocouple defective	Check the thermocouple wiring and location. It should be in contact with the vitro-ceramic glass.
	alarm band Value on recipe too small	Increase the value in the receipt.
Thermocouple Short Cut Alarm	Thermocouple defective	Check the thermocouple wiring and location. It should be in contact with the vitro-ceramic glass.
	Bad PID loop tuning	Perform an auto-tune procedure.
	zone Fuse or circuit breaker down	Check the fuse or the circuit breaker.
	Resistor broken	Check the resistor.
	Static Relay	Check the relay.
Thermocouple Broken Alarm	Thermocouple defective	Change the thermocouple.
	Defective wiring	Check the wiring.
Security Bar Alarm	Security bar not in place	Place the bar in the correct position.
	Sensor bad adjust	Adjust the sensor.
	Reflector broken	Replace the reflector.
Open Hood Alarm	Hood close sensor defective	Check the position and the wiring of the magnetic sensor.
	Circuit breaker/fuse of the electrical cylinder down	Check the circuit breaker/fuse.
Exhaust Alarm	Air flow	Check the airflow and compare to the one specified. Increase the exhaust air flow if necessary.
	Flow pressure sensor defective	Check the wiring of the sensor, the pipe connection, and the adjustment screw.
PCB spacing length is lower to PCB hole max length	Recipe error	Correct recipe for having PCB spacing length higher than PCB hole max length.
Loss Conveyor Parameters	Conveyor parameters lost	Recalibrate the conveyor (refer to the *TC V3 Operations Manual*).
Dropped Board Alarm	Board dropped	1. Stop the Oven. 2. Open it. 3. Remove the board.
	Photo cell defective	Adjust the sensor (refer to the *Conveyor Counter Cell Adjustment* procedure) Check the wiring.

Alarms / Trouble	Possible Causes	Verifications and Actions
Board Jam Alarm	Photo cell defective	Adjust the sensor (refer to the *Conveyor Counter Cell Adjustment* procedure) Check the wiring.
	Improper alignment of the oven with the downstream machine	Check and adjust the position of the downstream machine if necessary.
Input Transfer Alarm	Photo cell defective	Adjust the sensor (refer to the *Conveyor Counter Cell Adjustment* procedure) Check the wiring.
	Improper alignment of the oven with the downstream machine	Check and adjust the position of the downstream machine if necessary.
Downstream Alarm	Downstream machine down	Check the downstream machine status.
Lubricator Alarm Level	Lower oil level	Fill oil tank.
Humidifier Alarm	Humidifier error	Check the humidifier status.

5 Parts List

This section contains parts ordering information for the TC V3 Conformal Curing Oven. Part number information is also available on Nordson ASYMTEK's Find-A-Part web page:

http://webstore.asymtek.com/awweblive/apps/findapart_index.asp

WARNING! Parts replacement should only be performed by trained service technicians. Nordson ASYMTEK assumes no liability for personal injury or property damage that may occur as a result of spare parts being replaced by other than trained technicians.

Level 1 – Consumable Parts

Figure 5-1 Consumable, wearing parts, to be kept in-stock on production site.

Designation	Reference	Manufacturer
Solid state relay 35A		CELDUC
Regulation thermocouple - TCK Ø1.5 INO X 300 mm	630-09341	VIT
Vitro-ceramic glass	200-38214	PRECIVER
Fuse box	622-16868	VIT
Conveyor speed sensor - XS1 N05 PA310	621-07546	SCHNEIDER
Conveyor chain oil	654-13765	VIT
Light tower bulb (set of 10)	624-15426	SCHNEIDER

Level 2 – Recommended Parts

Figure 5-2 Parts recommended by the equipment manufacturer to be kept in-stock.

Designation	Reference	Manufacturer
Air flow detector – Dwyer 1823-2	642-34576	DWYER
Silicone rubber seal (process chamber) - 15X21 SIL 30A price for one meter	643-14716	PROGRESS
Silicone cartridge DC732	654-07882	VIT
Deflector entry	200-44979	VIT
Deflector between vitro-ceramic glass (set of 3)	200-44978	VIT
Set of 3 vitro-ceramic glasses	200-38214	VIT
Aluminium pipe D80	640-43025	VIT
Pin chain master link	683-16926	VIT
Dropped board sensor – PZ-51P	621-07120	KEYENCE
Gas Spring D8 C80 F450N	032616	VIT
Chain guide / ball bearing (set of 8)	680-43206	VIT

Level 3 - Long Lead-Time Parts

Figure 5-3 Parts with a long procurement lead-time or for software update.

Designation	Reference	Manufacturer
24 VDC power supply 2.5A	627-46962	VIT
Cooling fan	640-15814	VIT
Safety relay (2NO 24Vdc)		SIEMENS
Tactile screen TP170B	620-40537	SIEMENS
Siemens PLC power module	620-40528	SIEMENS
SIEMENS PLC ET200S/IM151-CPU	620-40526	SIEMENS
Siemens PLC 4 digital input ET200S/MOD 4DI/24VCC	620-40530	SIEMENS
Siemens PLC 4 digital output ET200S/MOD 4DO 24VCC/0.5A	620-40531	SIEMENS
Siemens PLC 2 analog tc input ET200S/MOD 2AI TC/RTD	620-40532	SIEMENS
Siemens PLC 2 analog output ET200S/MOD 2AO STD +-10V	620-40653	SIEMENS
Siemens PLC programming software for pc stepset		SIEMENS
Siemens PLC programming software for tactile screen : protocol	620-42079	SIEMENS
Siemens PLC interface cable USB and hardware driver	620-47341	SIEMENS
PCB sensor for SMEMA upstream or downstream	621-42130	BAUMER
Motor and gear box 1440/320	682-38459	VARVEL
Motor frequency controller – G110 / 0.25KW		SIEMENS
Centrifugal fan/intake blower – for 5.6 and longer 2650 m3/h 1500W	640-20177	VIT
Safety sensor hood close	621-38236	SIEMENS
Magnetic target hood close	621-38237	SIEMENS
Sensor and reflector electrical wood lift	621-09212 / 621-38229	TELEMECANIQUE
Resistor 2500w/400V – 3600w/480V	200-48165	VIT
Resistor 1500w/400V – 2000w/480V	200-48163	VIT
Klaxon		TELEMECANIQUE
Electric hood lift C500-F400	681-36226	VIT

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